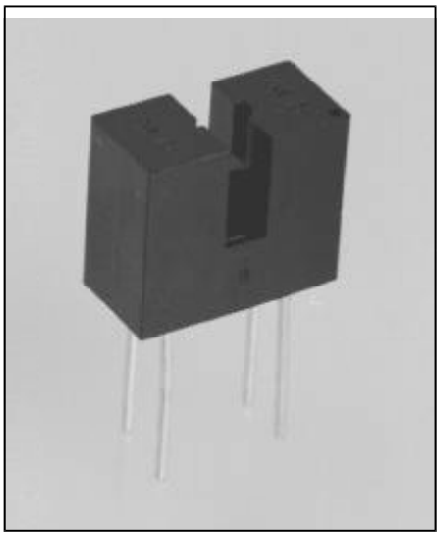
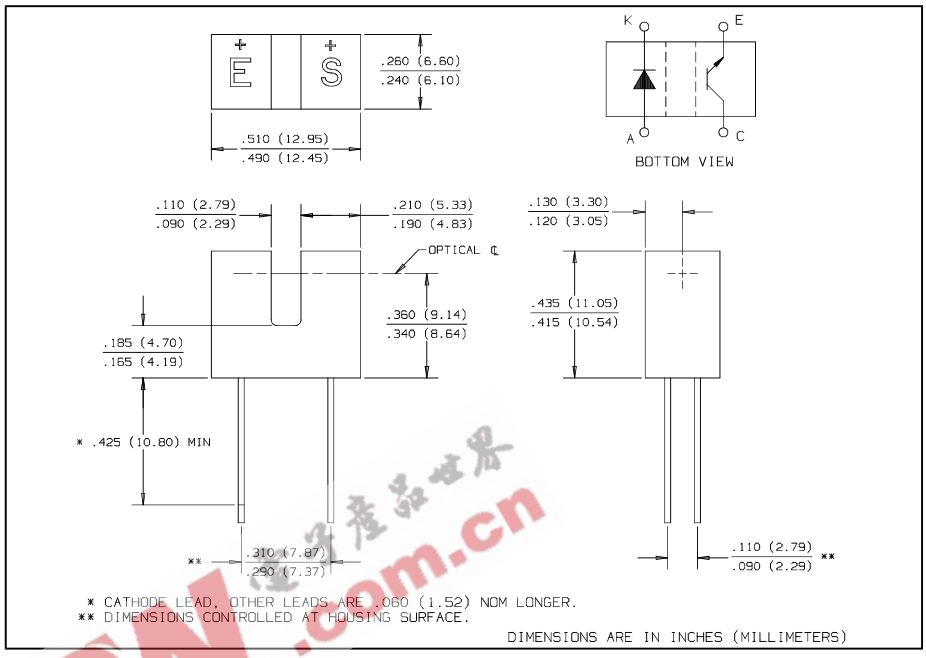
# Hi-Rel Slotted Optical Switches
# Types OPB847TX, OPB847TXV, OPB848TX, OPB848TXV






## Features

- Non-contact switching
- Apertured for high resolution
- Hermetically sealed components
- Components processed to Optek's screening program patterned after MIL-PRF-19500 for TX and TXV devices

## Description

The OPB847TX, OPB847TXV, OPB848TX, and OPB848TXV each consist of a gallium aluminum arsenide LED and a silicon phototransistor soldered into a printed circuit board then mounted in a high temperature plastic housing on opposite sides of a 0.100 inch (2.54 mm) wide slot. Phototransistor switching takes place whenever an opaque object passes through the slot. Both device types have a 0.025 inch (0.635 mm) by 0.06 (1.52 mm) aperture in front of the phototransistor for high resolution positioning sensing.

The OPB847TX, OPB847TXV, OPB848TX, and OPB848TXV use optoelectronic components that have been processed and tested as either TX or TXV components per MIL-PRF-19500. Typical screening and lot acceptance tests are provided on page 13-4.

## Absolute Maximum Ratings ($T_A$ = 25° C unless otherwise noted)

Operating Temperature Range . . . . . -65° C to +125° C
Storage Temperature Range . . . . . -65° C to +150° C
Lead Soldering Temperature [1/16 inch (1.6 mm) from case 5 sec. with soldering iron] . . . . . 240° C

**Input Diode**

Forward DC Current . . . . . 50 mA
Reverse Voltage . . . . . 2.0 V
Power Dissipation . . . . . 100 mW(2)

**Output Phototransistor**

Collector-Emitter Voltage . . . . . 50 V
Emitter-Collector Voltage . . . . . 7.0 V
Power Dissipation . . . . . 100 mW(2)

**Notes:**
(1) Duration can be extended to 10 sec. max. when flow soldering.
(2) Derate linearly 1.00 mW/° C above 25° C.
(3) Methanol and isopropanol are recommended as cleaning agents.

# Types OPB847TX, OPB847TXV, OPB848TX, OPB848TXV

**Electrical Characteristics** ($T_A$ = 25° C unless otherwise noted)

| Symbol | Parameter | | Min | Typ | Max | Units | Test Conditions |
|---|---|---|---|---|---|---|---|
| **Input Diode** | | | | | | | |
| $V_F$ | Forward Voltage(4) | | 1.00 | 1.35 | 1.70 | V | $I_F$ = 20.0 mA |
| | | | 1.20 | 1.55 | 1.90 | V | $I_F$ = 20.0 mA, $T_A$ = -55° C |
| | | | 0.80 | 1.20 | 1.60 | V | $I_F$ = 20.0 mA, $T_A$ = 100° C |
| $I_R$ | Reverse Current | | | 0.1 | 100 | µA | $V_R$ = 2.0 V |
| **Output Phototransistor** | | | | | | | |
| $V_{(BR)CEO}$ | Collector-Emitter Breakdown Voltage | | 50 | 110 | | V | $I_C$ = 1.0 mA, $I_F$ = 0 |
| $V_{(BR)ECO}$ | Emitter-Collector Breakdown Voltage | | 7.0 | 10.0 | | V | $I_E$ = 100 µA, $I_F$ = 0 |
| $I_{C(off)}$ | Collector-Emitter Dark Current | | | 0.2 | 100 | nA | $V_{CE}$ = 10.0 V, $I_F$ = 0 |
| | | | | 10 | 100 | µA | $V_{CE}$ = 10.0 V, $I_F$ = 0, $T_A$ = 100° C |
| **Coupled** | | | | | | | |
| $I_{C(on)}$ | On-State Collector Current(4) | OPB847 | 4.0 | | | mA | $V_{CE}$ = 10.0 V, $I_F$ = 20.0 mA |
| | | OPB847 | 2.5 | | | mA | $V_{CE}$ = 10.0 V, $I_F$ = 20.0 mA, $T_A$ = -55° C |
| | | OPB847 | 2.5 | | | mA | $V_{CE}$ = 10.0 V, $I_F$ = 20.0 mA, $T_A$ = 100° C |
| | | OPB848 | 1.0 | | | mA | $V_{CE}$ = 10.0 V, $I_F$ = 20.0 mA |
| | | OPB848 | 0.6 | | | mA | $V_{CE}$ = 10.0 V, $I_F$ = 20.0 mA, $T_A$ = -55° C |
| | | OPB848 | 0.6 | | | mA | $V_{CE}$ = 10.0 V, $I_F$ = 20.0 mA, $T_A$ = 100° C |
| $V_{CE(SAT)}$ | Collector-Emitter Saturation Voltage | OPB847 | | 0.20 | 0.30 | V | $I_C$ = 2.0 mA, $I_F$ = 20.0 mA |
| | | OPB848 | | 0.20 | 0.30 | V | $I_C$ = 500 µA, $I_F$ = 20.0 mA |
| $t_r$ | Output Rise Time | OPB847 | | 12.0 | 20.0 | µs | $V_{CC}$ = 10.0 V, $I_F$ = 20.0 mA, $R_L$ = 1,000 Ω |
| | | OPB848 | | 8.0 | 15.0 | µs | |
| $t_f$ | Output Fall Time | OPB847 | | 12.0 | 20.0 | µs | |
| | | OPB848 | | 8.0 | 15.0 | µs | |

(4) Measurement is taken during the last 500 µs of a single 1.0 ms test pulse. Heating due to increased pulse rate or pulse width can cause change in measurement results.





Optek Technology, Inc. 1215 W. Crosby Road Carrollton, Texas 75006 (972)323-2200 Fax (972)323-2396